

Application No.: 10/720,197

REMARKS

Claim 1 is the sole independent claim and stands rejected under 35 U.S.C. § 103 as being unpatentable over JP '247 in view of Ohkuni et al. '688 ("Ohkuni"). This rejection is respectfully traversed for the following reasons.

Claim 1 recites in pertinent part, "exposing the resist pattern to a gas containing sulfur to improve a strength of sidewalls of the resist pattern; and performing dry etching of the thin film using as a mask the resist pattern *whose strength has been improved* because of the gas containing sulfur" (emphasis added). The Examiner relies on JP '247 as the primary reference and admits that JP '247 does not disclose exposing the resist 3 of JP '247 to a gas containing sulfur. The Examiner therefore relies on Ohkuni as allegedly disclosing resist-exposure to a gas containing sulfur and thereby modifies JP '247 in an attempt to reach the claimed invention. However, it is respectfully submitted that even assuming *arguendo* proper, the proposed combination does not disclose or suggest the claimed invention. One object of the present invention is directed to providing the capability to prevent the collapse of the resist pattern which can result from stress caused by heat coming from plasma and ultraviolet radiation.

As set forth in claim 1, etching of the thin film is performed using as a mask the resist pattern *whose strength has been improved* because of the gas containing sulfur, which gas containing sulfur the resist pattern was exposed to in the prior step. In contrast, Ohkuni, which the Examiner exclusively relies on for teaching exposure of the resist to a gas containing sulfur, discloses only resist-exposure to a gas containing sulfur *during the etching step*. That is, Ohkuni discloses sulfur is contained in the *etching gas* so that the resist pattern is exposed to sulfur *during etching*; whereas, according to claim 1, etching is performed after the resist pattern is exposed to a gas containing sulfur so that the sidewalls can be strengthened before the etching

Application No.: 10/720,197

step. Indeed, claim 1 recites "etching ... using ... the resist pattern whose strength *has been improved* because of the gas containing sulfur," which gas containing sulfur was referenced in the prior step of "exposing the resist pattern to a gas containing sulfur to improve a strength of sidewalls of the resist pattern."

Accordingly, if JP '247 were modified by Ohkuni, the proposed combination would not disclose two *distinct* steps of exposing AND etching. Rather, the proposed combination would, at best, suggest only a single etching step during which the resist is exposed to sulfur. This distinction in the process of claim 1 and the proposed combination emphasizes a broader difference between the present invention and cited prior art. For example, although Ohkuni discloses that C-S bonds protect the sidewalls of the resist pattern, Ohkuni fails to disclose or suggest that exposing the resist pattern to a gas containing sulfur increases the strength of sidewalls of the resist pattern. Indeed, Ohkuni does not provide any disclosed need or desire to strengthen the sidewalls of the resist, and therefore would provide no motivation for adding a new process step of exposing the resist to a gas containing sulfur prior to etching. Only Applicants have recognized and considered the need to strengthen the sidewalls *prior to etching* as described in Applicants' specification related to the admitted prior art (see corresponding Figure 3 of Applicants' drawings), and conceived of a novel manner by which to strengthen the sidewalls in advance of etching to obviate potential problems that may otherwise arise during etching.

The Examiner is directed to MPEP § 2143.03 under the section entitled "All Claim Limitations Must Be Taught or Suggested", which sets forth the applicable standard for establishing obviousness under § 103:

**Application No.: 10/720,197**

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (citing *In re Royka*, 180 USPQ 580 (CCPA 1974)).

In the instant case, the pending rejection does not "establish *prima facie* obviousness of [the] claimed invention" as recited in claim 1 because the proposed combination fails the "all the claim limitations" standard required under § 103.

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims are patentable based on their own merits by adding novel and non-obvious features to the combination.

Based on the foregoing, it is respectfully submitted that all pending claims are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejections under 35 U.S.C. § 103 be withdrawn.

### CONCLUSION

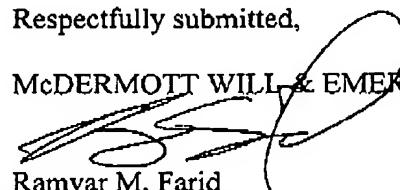
Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

**Application No.: 10/720,197**

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



Ramyar M. Farid  
Registration No. 46,692

600 13<sup>th</sup> Street, N.W.  
Washington, DC 20005-3096  
Phone: 202.756.8000 RMF:men  
Facsimile: 202.756.8087  
Date: April 11, 2006

Please recognize our Customer No. 20277  
as our correspondence address.